

Applicant: Katsumi Sameshima
Serial No.: 09/451,979
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Our Docket: 362-39
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VERSION OF AMENDMENT WITH MARKS
TO SHOW CHANGES MADE

IN THE SPECIFICATION:

At page 1, replace the paragraph beginning at line 25 and ending at page 2, line 9 with the following:

In the prior art, however, a conductive film 5a, a ferroelectric film 4a and a conductive film 3a are formed to a thickness to provide an upper electrode 5, a ferroelectric film 4 and a lower electrode 3, so that dry etching is then conducted throughout a total film thickness in order to remove unwanted portions of these films[.]. Thus, the prior art has required a much greater etch amount and hence a [long] longer etch time. This results in [long-time] longer exposure of the ferroelectric film 4 to the plasma atmosphere during a dry etch process. The plasma however has effects upon the ferroelectric 4 [to] that lower its switching charge amount (Q_{sw}). Thus, there has been a fear of causing such [problem] problems as worsening the symmetry in hysteresis and deteriorating the characteristics of coerciveness and fatigue.

At page 6, replace the paragraph beginning at line 2 with the following:

A method for manufacturing a ferroelectric memory 10 will now be explained concretely with reference to Figure 2 and Figure 3. First, not-shown silicon (Si) substrate is prepared, to form thereon by a CVD technique a first insulation film 12 of silicate glass containing phosphorus (PSG), silicate glass containing boron/phosphorus (BPSG) or the like. Subsequently, as shown in Figure 2(A) the first insulation film 12 is masked by a patterned resist 24 to form a hollow 14 by an RIE (reactive ion etching) technique as anisotropic dry etching. Then, as [shwon] shown in Figure 2(B), a first conductive film 26 as a gel dry film is formed by a sol-gel technique on a surface of the first insulation film 12 including an inside of the hollow 14. That is, an Ir precursor solution is formed by subjecting a metal alkoxide solution containing irridium (Ir) as an ingredient element to hydrolysis/polycondensation.

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This solution is applied onto a surface of the first insulation film 12 by a spin coating technique, and then dried into a gel dry film. In an application process using a spin coating technique, the precursor solution dripped on the surface of the first insulation film is splashed away due to a centrifugal force. However, the precursor solution existing inside the hollow 14 will not readily be splashed away. This provides the first conductive film 26 with a film thickness that is greater [at] inside the hollow 14 than the other portion, as shown in Figure 2(B).

At page 7, replace the paragraph beginning at line 23 with the following:

According to the present embodiment, a hollow 14 was formed in the top surface of the insulation film 12 so that a lower electrode 16 can be formed inside the hollow 14 by the sol-gel technique including a spin-coating application process. As stated before, it is therefore possible to decrease an etch time to provide a lower electrode 16. This in turn reduces the time for which the film 28 for providing a ferroelectric 18 is exposed to a dry-etching plasma atmosphere. Thus, the ferroelectric 18 can be prevented from being deteriorated in characteristics by the [affection] effects of a plasma.

At page 10, replace the paragraph beginning at line 6 with the following:

Meanwhile, as shown in Figure 10, a first electrode portion 16a may be formed at a corner of the hollow 14 by a process including spin coating (e.g. sol-gel technique) so that a second electrode portion 16b can be formed to provide a lower electrode 16. In this case, if the second electrode portion 16b is formed by a process including a spin coat technique (e.g. sol-gel technique), it is possible to [decreases] decrease an amount of depression to be caused in a top surface center thereof upon baking the lower electrode 16. Meanwhile, if the second electrode portion 16b, or first conductive film 26b, is formed by sputtering, the variation in crystalline orientation is reduced in a top surface of the lower electrode 16, as shown in Figure 11. This serves to stabilize a crystalline state of the ferroelectric 18 (Figure 10) to be formed on the lower electrode 16. Furthermore, if the first electrode portion 16a is formed